1. IC2.1: Why Certain Products Are Issued

Instructor Notes: Welcome to the AWOC Winter Track Instructional Component 2, Lesson 1. This presentation, Why Certain Products Are Issued, should last approximately 30 minutes.

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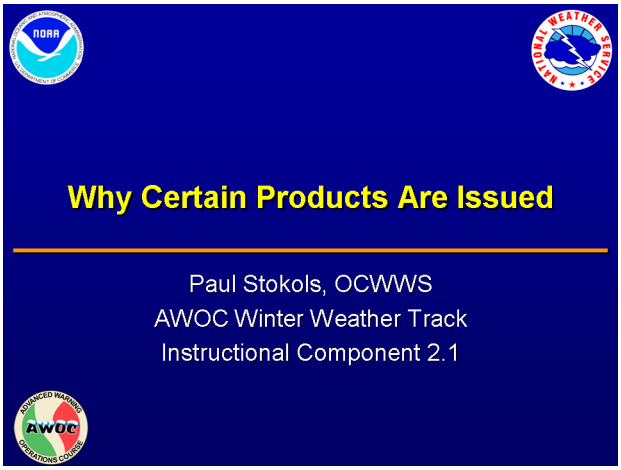

2. Outline

Instructor Notes: This lesson will focus on recent changes to NWS policy as a result of multiple surveys, regional coordination, forecaster input, and technological advances. We will look at past operational problems and their remedies; recently updated policy directives; the use of specific Winter Storm Warning and Advisory elements and event-specific decision flow charts; and finally, we provide numerous scenarios to aid in your decision-making skills.

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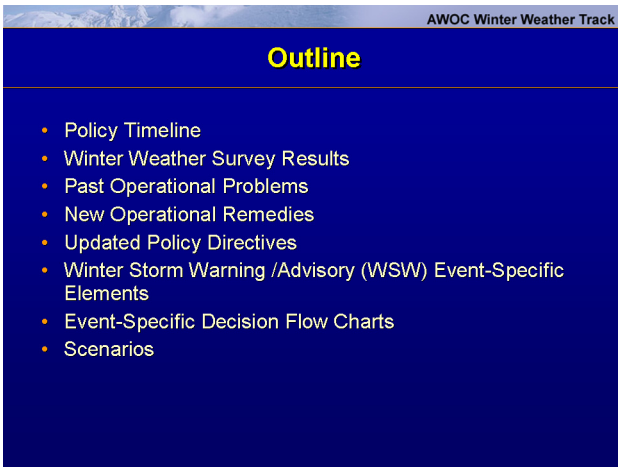

3. Winter Weather Policy Time Line

Instructor Notes: A little history…Event specific winter weather warnings and advisories are not new. They were used as far back as the 1970s in the zone forecast product and special weather statements. In 1992, winter storm warning products were implemented which allowed generic or event-specific headers and headlines in a non-segmented format. In 1998 segmented formatting allowed forecasters to issue separate headline hazards and follow up statements.

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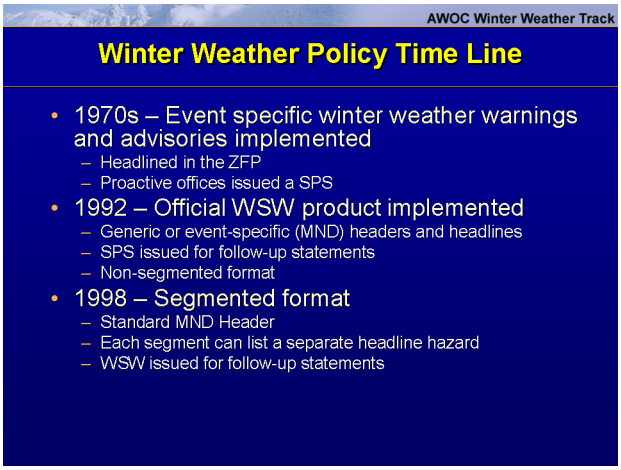

4. Winter Weather Policy Time Line

Instructor Notes: NWSI 10-513 was updated in 2002 replacing the outdated WSOM C-42. The new policy directive had a standardized list of winter weather products and mandated the issuance of event specific warnings and advisories. As national vendors were able to decode automatically our WSW headlines into on screen text crawls and automated watch/warning/advisory maps, 2004 brought about headline standardization. After several years of development, VTEC arrived in 2005 which allowed specific event coding of Watch, Warnings, and Advisories and created automatic headlines.

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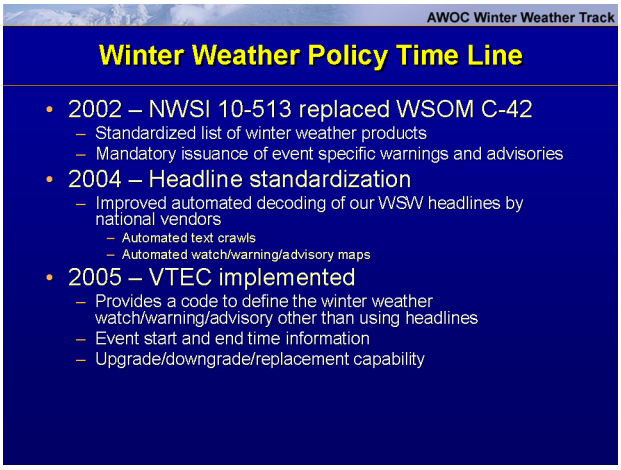

5. Event Specific Winter Weather Policy Supported by Customers

Instructor Notes: Our customers support our event specific winter weather policy. NWS sponsored separate surveys of the emergency management, media, and general public communities during the 2003-2004 time frame. The survey was conducted by the American Customer Satisfaction Index (ACSI) group. ACSI and NWS developed a broad range of questions that were used to find the strengths and shortfalls in understanding of and need for NWS public forecast and warning products and services. Among the findings across all 3 surveys was that there is a need for more specific winter weather warning products. In Oct. 2004, the NWS internal Corporate Board Operations Committee was presented the results of the survey and they agreed to endorse event-specific winter weather policy.

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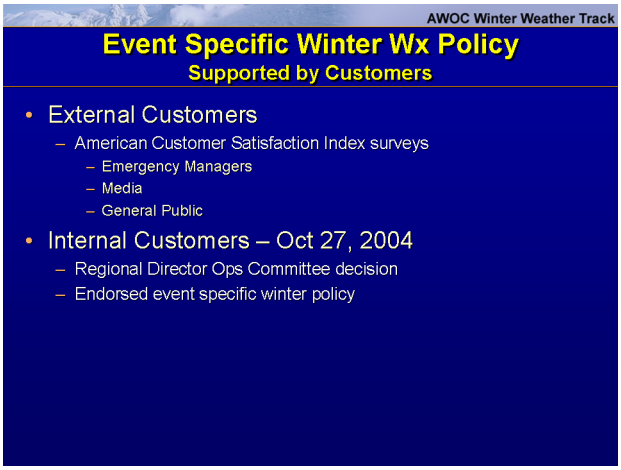

6. American Customer Satisfaction Index (ACSI)

Instructor Notes: What is the American Customer Satisfaction Index (ACSI)? ACSI was established in 1994 at the National Quality Research Center at University of Michigan using methodology licensed from CFI Group. ACSI is the #1 national economic indicator of customer satisfaction and is widely used in government agencies and the private sector. In fact, over 55 federal agencies and 200 companies representing 10 economic sectors and 41 industries and two thirds of the U.S. economy have participated in similar surveys. ACSI's advanced methodology uses a 0-100 scale to measure and link satisfaction levels to performance. Based on relative scoring, improvements can be prioritized which allows organizations to get the most bang for the buck. Results are published quarterly in the Wall Street Journal. See the web link for additional information.

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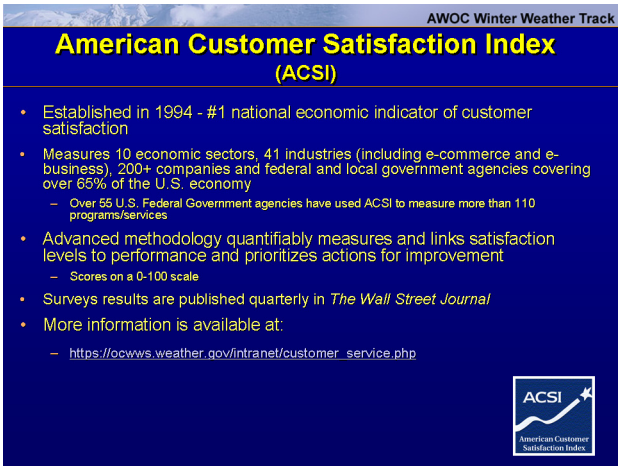


7. Background (cont.)ACSI in the News

Instructor Notes: These publications and media outlets have all run pieces on ACSI.

Student Notes:

8. Federal Government ACSI Clients

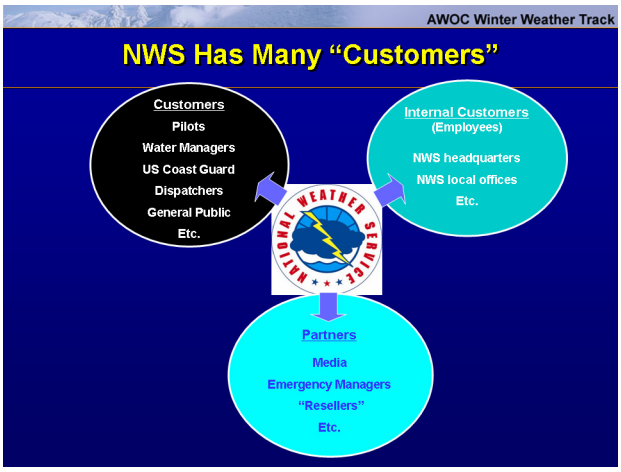
Instructor Notes: This is a listing of SOME of the federal government agencies that utilize ACSI.

Student Notes:

9. NWS Has Many "Customers"

Instructor Notes: We have three "sets" of customers: 1) Partners – those that resell or rebroadcast our forecasts and warnings, 2) Customers – those that ultimately receive our forecasts and warnings and plan accordingly, and 3) Internal customers, or our employees

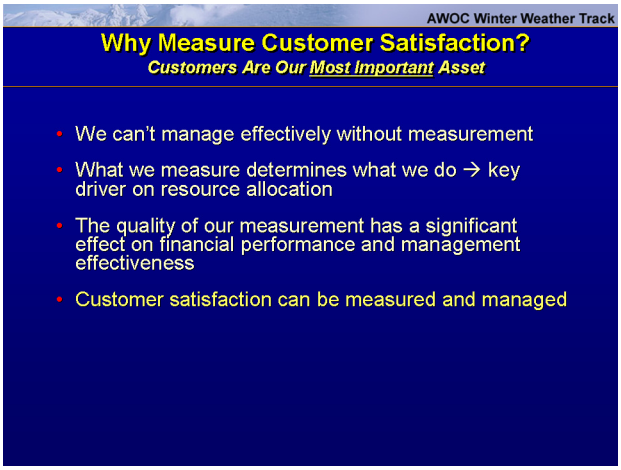
Student Notes:



10. Why Measure Customer Satisfaction? Customers Are Our Most Important Asset

Instructor Notes: Customers are our most important asset. Measurement and analysis of customer satisfaction allows us to manage resources and determine how we can improve our services to meet user's needs.

Student Notes:



11. Winter Weather Information

Instructor Notes: Our first winter weather question in the survey asked participants to rate the utility of critical winter weather information for an impending storm on a scale of 1 to 10 where 10 is the highest utility. There were 6 critical parameters: snowfall rate (intensity), start and end times, specific type advisory, specific type warning, time or precipitation type change, and effect of high winds.

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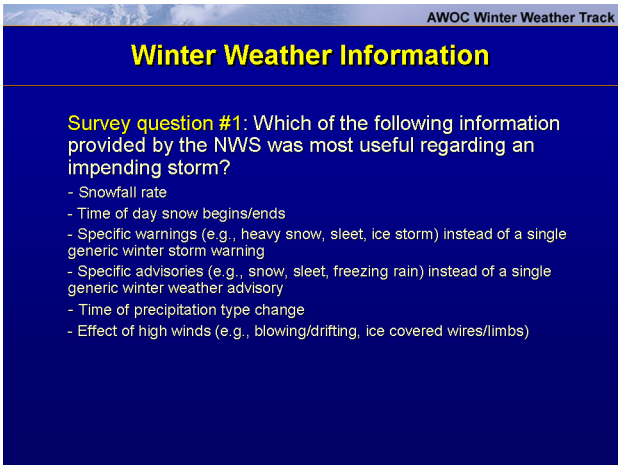
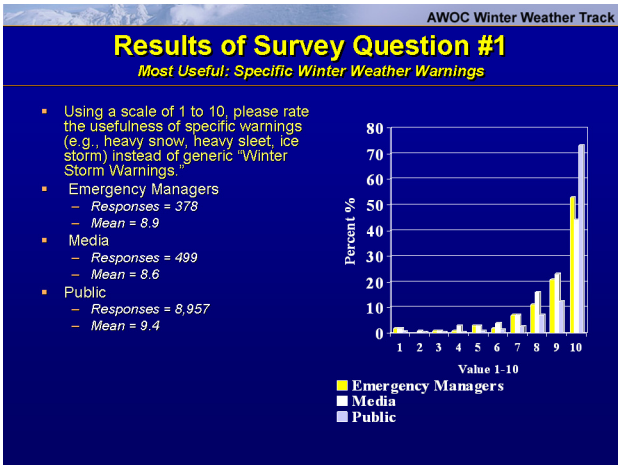


12. Results of Survey Question #1 Most Useful: Specific Winter Weather Warnings

Instructor Notes: The clear winner for all 3 surveys was specific type winter weather warnings.

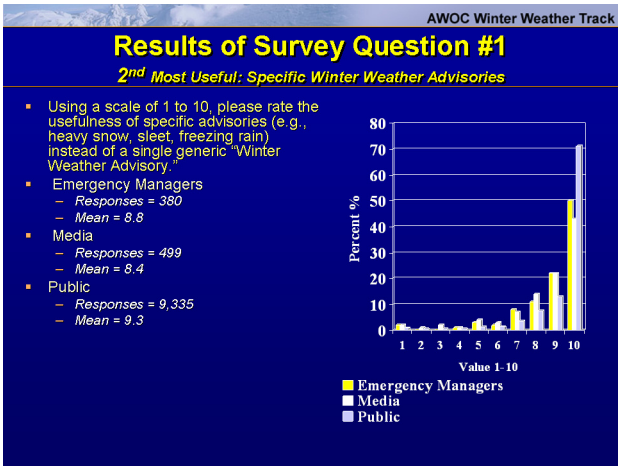
Student Notes:



13. Results of Survey Question #1 2nd Most Useful: Specific Winter Weather Advisories

Instructor Notes: Followed by specific type winter weather advisories.

Student Notes:



14. Survey Question #2

Instructor Notes: Next, we wanted to gauge how much specificity respondents wanted to have in their warnings, given different forecast conditions expected across their region.

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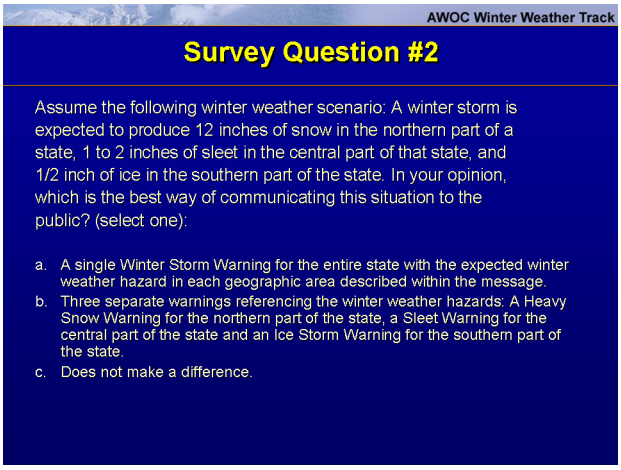
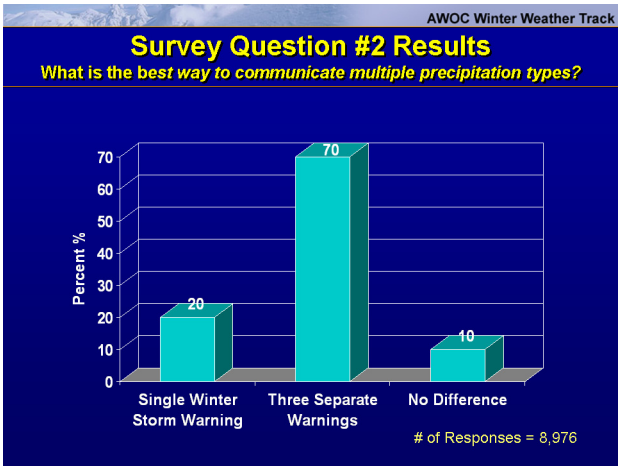


15. Survey Question #2 Results: What is the best way to communicate multiple precipitation types?

Instructor Notes: By a 2 to 1 margin, a breakout of more detailed warnings was preferred.

Student Notes:



16. Survey Findings

Instructor Notes: So the combined result of these two survey questions showed a preference for more specificity in winter event types and separate event warnings instead of a single catchall warning for an entire state or region.

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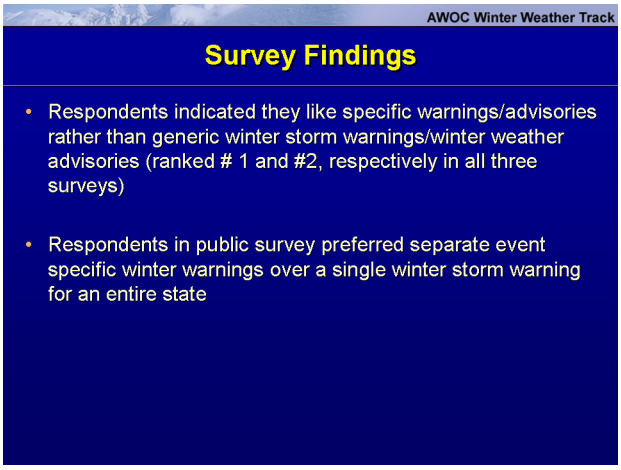

17. Past Operational Problems

Instructor Notes: Historically, NWS was beholden to technology and software constraints. The Winter Storm Warning format did not lend itself to automation, headlines were not standardized, and there was no software mechanism for depicting upgrades/ downgrades/replacements to existing products. As color graphical displays became the "norm" NWS products looked like a "patchwork quilt" that instantly had a negative confusing impact. For example, Eastern Region (no I am not picking on you) was ahead of its time as it tried issuing event specific warnings and advisories in the mid '90s. At that time local customers/partners were confused with changeable events and resultant patchwork quilt. After considerable negative feedback, the next winter ER WFOs went back to issuing mostly generic Winter Storm Warnings/Winter Weather Advisories.

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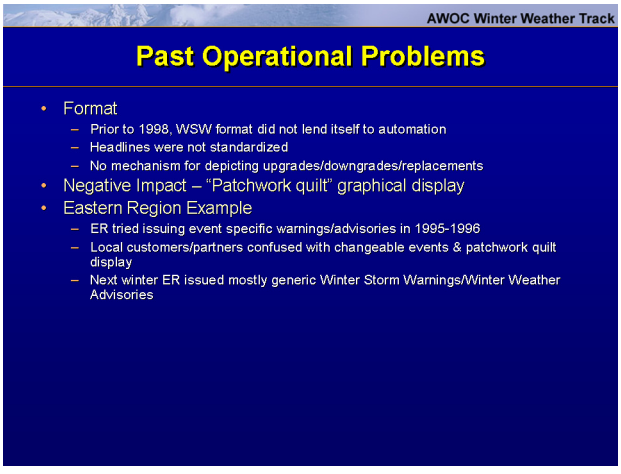
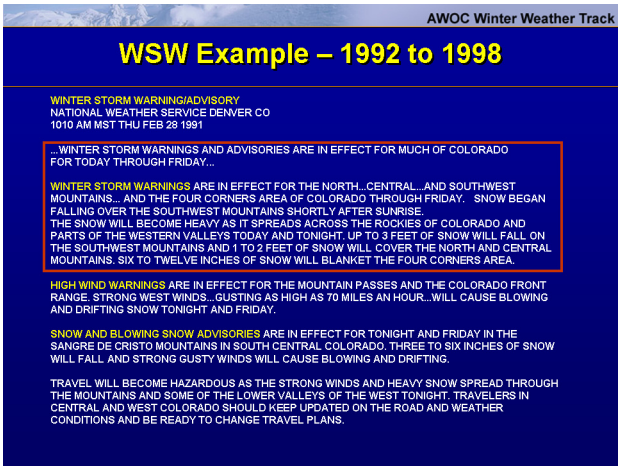


18. WSW Example – 1992 to 1998

Instructor Notes: Another confusing example from the Denver WFO in 1991 shows multiple warnings and advisories for what essentially is a heavy snow storm with blizzard conditions forecast for the mountain passes and front range.

Student Notes:



19. Past Operational Problems

Instructor Notes: In the recent past, inconsistent and confusing national and regional policy, and limited coordination between surrounding WFOs and across regional lines led to a hodgepodge of warnings which is quite apparent in this colorized presentation of warnings for an event covering the Ohio Valley and Mid Atlantic regions. National and local customers were often confused and unhappy with the results.

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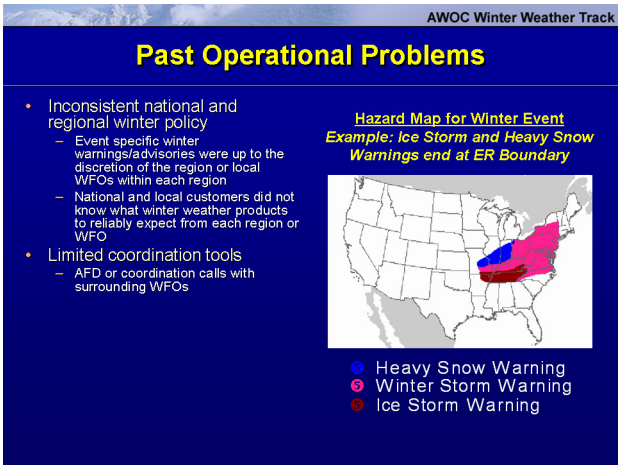


20. New Operational Remedies

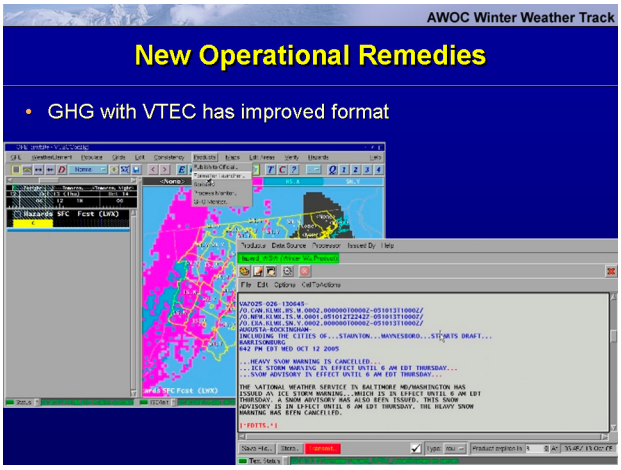
Instructor Notes: Today, a combination of consistent national and regional policy, and improved collaboration and coordination tools have clarified and enhanced the winter storm warning program. Forecasters have the knowledge and tools to produce warnings and advisories that meet customers needs, inform the public to take appropriate actions. Within the Weather Forecast Office, increased coordination and collaboration with HPC, other WFOs, and the external users via new gridded and graphical products, and inter-site coordination and communication tools, enable the entire forecast "team" to add value and consistency to the final products.

Student Notes:

21. New Operational Remedies

Instructor Notes: GHG provides a standardized segmented WSW format for vendor automation. It has helped to standardize headlines. VTEC provides an automated mechanism for depicting winter hazards. For example, upgrades/downgrades/replacements are automated in VTEC and Headlines. This provides a consistent, seamless graphical hazard display.

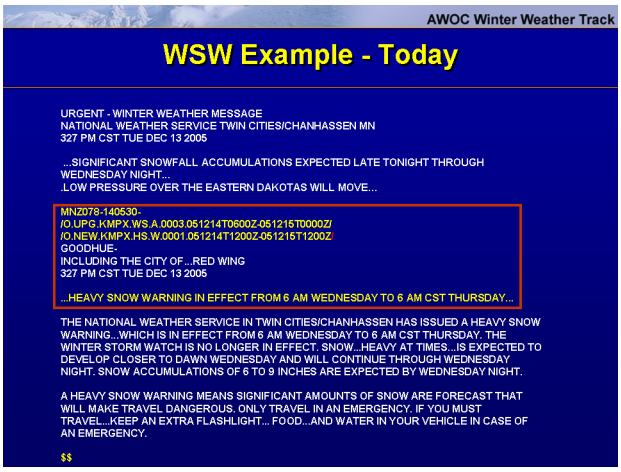
Student Notes:



22. WSW Example - Today

Instructor Notes: Unlike the earlier Denver example, today's warning shows specific event type, area and time of impact.

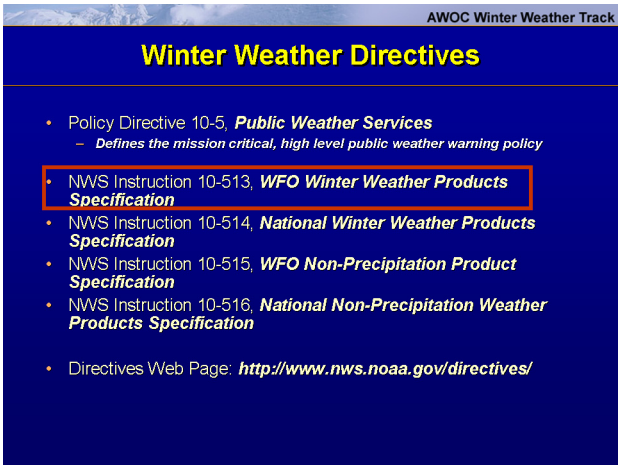
Student Notes:



23. Winter Weather Directives

Instructor Notes: To reflect the results of the surveys and clarify confusing policy, new policy directives were agreed upon by NWS Headquarters and the Regions. Winter weather policy is contained within the broad scope of the Pubic Weather Services Policy Directive 10-5. which defines the mission critical, high level public weather warning policies. 2 Instructions, 10-513 and 10-514, specify requirements for Winter Weather Products issued by Weather Forecast Offices and NCEP Hydrometeorological Prediction Center, respectively. For the purposes of this training module, we will focus on the 10-513, WFO Winter Weather Products. 2 Instructions, 10-515 and 10-516, specify requirements for Non-Precipitation Products, such as high winds or freeze warnings, issued by WFOs and NCEP, respectively. All current directives and associated instructions are available on the Directives home page.

Student Notes:



24. Instruction 10-513: Issuance Criteria Defined

Instructor Notes: Instruction 10-513 defines 3 types of issuance criteria for products issued by WFOs based on probability of occurrence and when local warning criteria are likely to be met. A Winter Storm Outlook is issued using a Special Weather Statement (SPS) or Hazardous Weather Outlook (HWO) when there is a 30% or greater chance of a hazardous winter weather event exceeding local warning criteria in the next 3-7 days. This product is intended to provide information to those who need considerable lead time to prepare for the event. A Winter Storm Watch is issued using a WSW when there is a 50% or greater chance of a hazardous winter weather event meeting or exceeding local warning criteria in the next 12 to 48 hours. In some cases forecaster confidence may lead to a watch issuance for beyond 48 hours but this is not specifically addressed in the Instruction. Although a watch indicates the risk of a hazardous winter weather event has increased, the occurrence, location, and/or timing is still uncertain. A Winter Storm Warning or Advisory is issued when there is a 80% or greater likelihood of a hazardous winter weather event meeting or exceeding local warning criteria in the next 36 hours. A warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant inconvenience and, if caution is not exercised, could lead to situations that may threaten life and/or property. In some cases forecaster confidence may lead to a warning issuance for beyond 36 hours but this is not specifically addressed in the Instruction.

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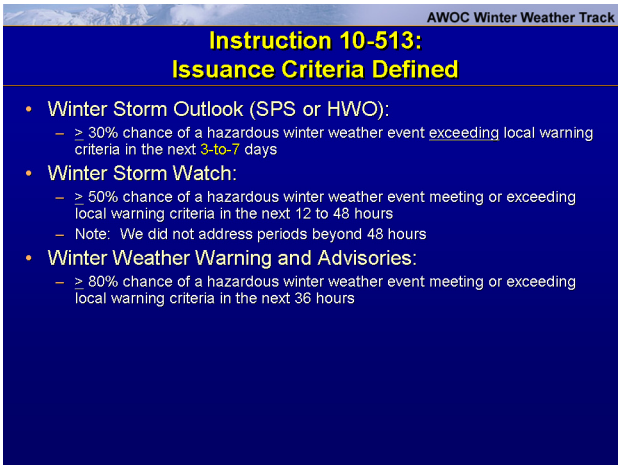


25. Products quiz

Instructor Notes:

Student Notes:

26. Catalog of Event Specific Products

Instructor Notes: Based on user feedback and improvements in modeling accuracy and forecaster skill, winter weather warnings and advisories can be broken out into "event-specific" categories.

Student Notes:

27. Event Specific Winter Warnings

Instructor Notes: This table summarizes issuance criteria for event specific warning products. Policy clearly states these categories should be used when the precipitation type can be determined with a high level of confidence. When confidence is low for a pre-dominant winter weather precipitation type or more than one type is expected, the WFO forecast team will issue a Winter Storm Warning.

Student Notes:

Event Specific Winter Warnings

Winter Weather Product	Issuance Criteria
Blizzard Warning	1) Sustained wind or frequent gusts ≥ 35 mph 2) Falling and/or blowing snow reducing visibility < ¼ mile for at least 3 hours
Heavy Snow Warning	Snow accumulation meeting or exceeding locally defined 12 and/or 24 hr warning criteria
Ice Storm Warning	Ice accumulation meeting or exceeding locally defined warning criteria (typical value ≥ ¼ inch)
Sleet Warning	Sleet accumulation meeting or exceeding locally defined warning criteria (typical value ≥ ½ inch)
Winter Storm Warning	Winter weather event having more than one predominant hazard: 1) Heavy snow and blowing snow* (near blizzard conditions) 2) snow and ice 3) sleet and ice 4) Snow, sleet and ice

28. Event Specific Winter Advisories

Instructor Notes: The “event-specific” Winter Weather Advisory categories are shown.

Student Notes:

Event Specific Winter Advisories

Winter Weather Product	Issuance Criteria
Blowing Snow Advisory	Widespread or localized blowing snow reducing visibilities to 1/4 mile or less with winds less than 35 mph
Freezing Rain Advisory	Light ice accumulation (freezing rain and/or freezing drizzle) meeting or exceeding locally defined advisory criteria, but remaining below warning criteria.
Lake Effect Snow Advisory	Widespread or localized lake effect snowfall accumulation reaching or exceeding locally defined advisory criteria, but remaining below warning criteria.
Sleet Advisory	Sleet accumulation meeting or exceeding locally defined advisory criteria but remaining below warning criteria.
Snow Advisory	Snowfall accumulation meeting or exceeding locally defined advisory criteria, but remaining below warning criteria.
Snow and Blowing Snow Advisory	Sustained wind or frequent gusts of 25 to 34 mph (or locally defined) accompanied by falling and blowing snow, occasionally reducing visibility to 1/4 mile or less for three hours or more.
Wind Chill Advisory	Wind chill temperatures reaching or exceeding locally defined advisory criteria, but remaining below warning criteria.
Winter Weather Advisory	Winter weather event having more than one predominant hazard (i.e., snow and ice, snow and sleet, or snow, ice and sleet) meeting or exceeding locally defined 12 and/or 24 hour advisory criteria for at least one of the precipitation elements, but remaining below warning criteria.

29. Winter Weather Warning vs. Wind Speed Criteria: Three Tiered System

Instructor Notes: Another critical factor is the combined impact of wind and heavy snow. A Heavy Snow Warning becomes a Winter Storm Warning when sustained winds or frequent gusts exceed 24 m.p.h. but are less than the 35 m.p.h. threshold for a Blizzard Warning.

Student Notes:

AWOC Winter Weather Track

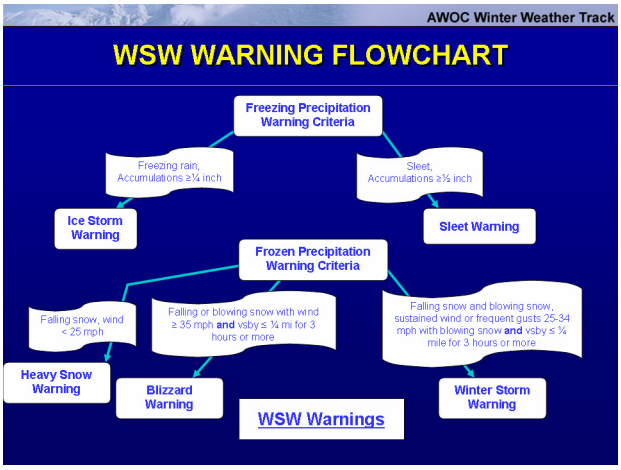
Winter Wx Warning vs. Wind Speed Criteria
Three Tiered System

Winter Weather Warning	Wind Speed Criteria
Heavy Snow Warning	0 to 24 mph
Winter Storm Warning	25 to 34 mph
Blizzard Warning	≥ 35 mph

30. WSW WARNING FLOWCHART

Instructor Notes: For those of you who think visually here's a decision flow chart to determine what Winter Storm Warning is appropriate.

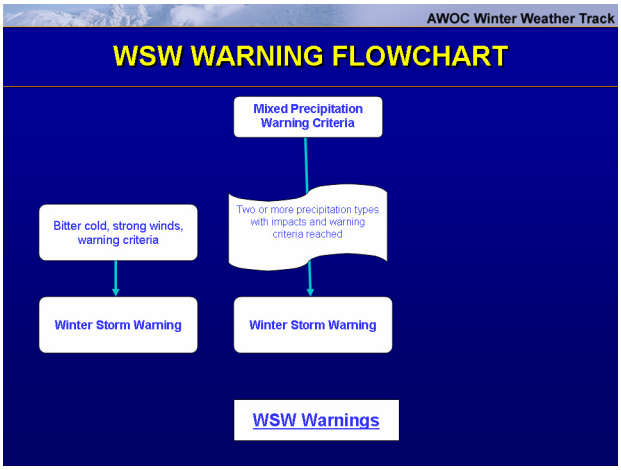
Student Notes:



31. WSW WARNING FLOWCHART

Instructor Notes: Part Two of the flow chart is for mixed precipitation scenarios.

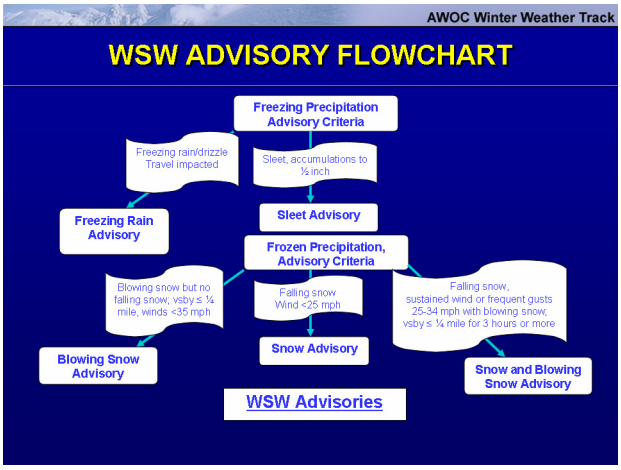
Student Notes:



32. WSW ADVISORY FLOWCHART

Instructor Notes: Similarly, an Advisory Flow chart is shown.

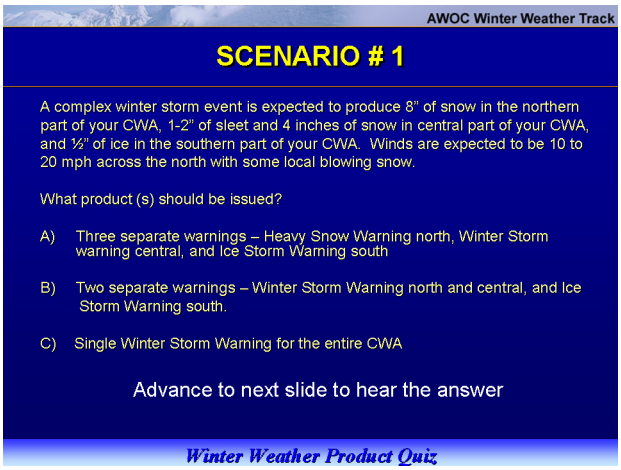
Student Notes:



33. SCENARIO # 1

Instructor Notes: Based on field input, several scenarios are presented to help you decide what product to issue. A complex winter storm event is expected to produce 8" of snow in the northern part of your CWA, 1-2" of sleet and 4 inches of snow in central part of your CWA, and 1/2" of ice in the southern part of your CWA. Winds are expected to be 10 to 20 m.p.h. across the north with some local blowing snow. What product (s) should be issued? A) Three separate warnings – Heavy Snow Warning north, Winter Storm warning central, and Ice Storm Warning south, B) Two separate warnings – Winter Storm Warning north and central, and Ice Storm Warning south, or C) Single Winter Storm Warning for the entire CWA .

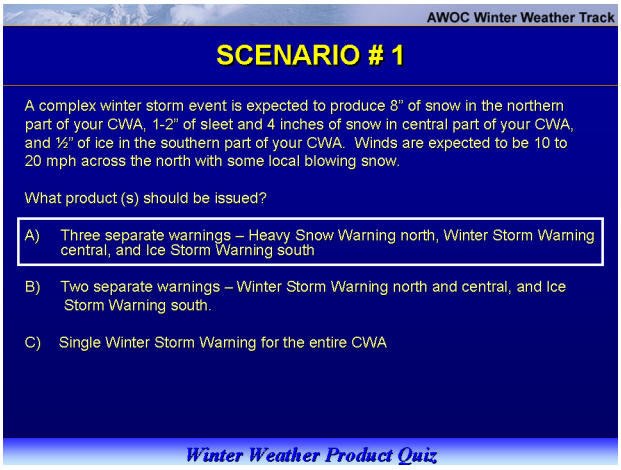
Student Notes:



34. SCENARIO # 1 (answer)

Instructor Notes: The answer is A, Three separate warnings – Heavy Snow Warning north, Winter Storm warning central, and Ice Storm Warning south, are needed. Wind speed and visibility criteria don't meet WSW criteria across the north.

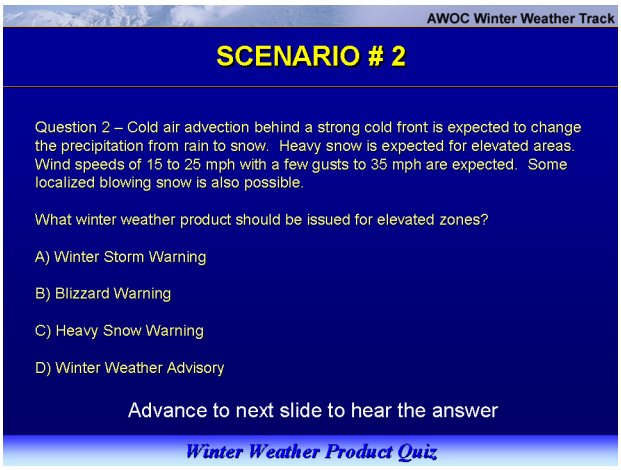
Student Notes:



35. SCENARIO # 2

Instructor Notes: Question 2 – Cold air advection behind a strong cold front is expected to change the precipitation from rain to snow. Heavy snow is expected for elevated areas. Wind speeds of 15 to 25 m.p.h. with a few gusts to 35 m.p.h. are expected. Some localized blowing snow is also possible. What winter weather product should be issued for elevated zones? A) Winter Storm Warning, B) Blizzard Warning, C) Heavy Snow Warning, or D) Winter Weather Advisory.

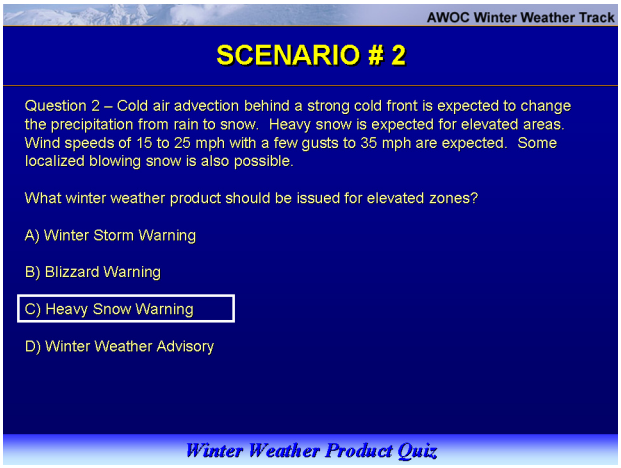
Student Notes:



36. SCENARIO # 2 (answer)

Instructor Notes: The answer is C, a heavy snow warning. Pay close attention to criteria. Winds are too low to meet Blizzard or WSW.

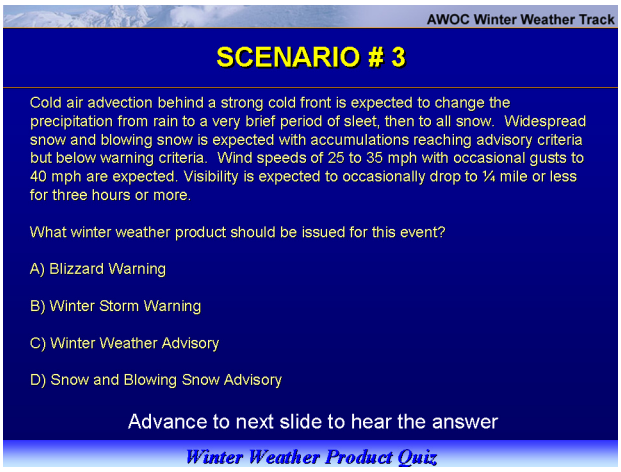
Student Notes:



37. SCENARIO # 3

Instructor Notes: Cold air advection behind a strong cold front is expected to change the precipitation from rain, to a very brief period of sleet, then to all snow. Widespread snow and blowing snow is expected with accumulations reaching advisory criteria but below warning criteria. Wind speeds of 25 to 35 m.p.h. with occasional gusts to 40 m.p.h. are expected. Visibility is expected to occasionally drop to 1/4 mile or less for three hours or more. What winter weather product should be issued for this event? A) Blizzard Warning, B) Winter Storm Warning, C) Winter Weather Advisory, or D) Snow and Blowing Snow Advisory. Hint: pay close attention to criteria.

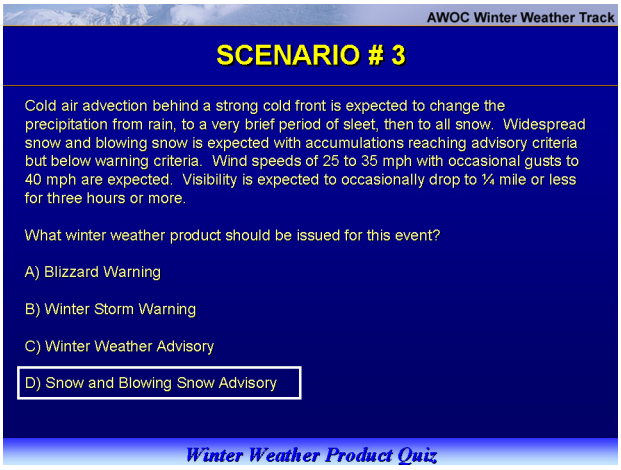
Student Notes:



38. SCENARIO # 3 (answer)

Instructor Notes: You have to pay close attention to criteria here. The answer is D, issue a Snow and Blowing Snow Advisory. The wind speed and snow criteria are not met.

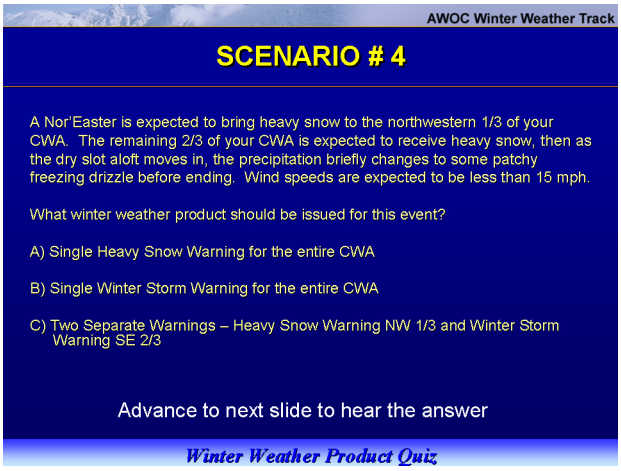
Student Notes:



39. SCENARIO # 4

Instructor Notes: A Nor'Easter is expected to bring heavy snow to the northwestern 1/3 of your CWA. The remaining 2/3 of your CWA is expected to receive heavy snow. Then, as the dry slot aloft moves in, the precipitation briefly changes to some patchy freezing drizzle before ending. Wind speeds are expected to be less than 15 m.p.h. What winter weather product should be issued for this event? A) Single Heavy Snow Warning for the entire CWA, B) Single Winter Storm Warning for the entire CWA, or C) Two Separate Warnings – Heavy Snow Warning NW 1/3 and Winter Storm Warning SE 2/3. Note: the key word is "predominant".

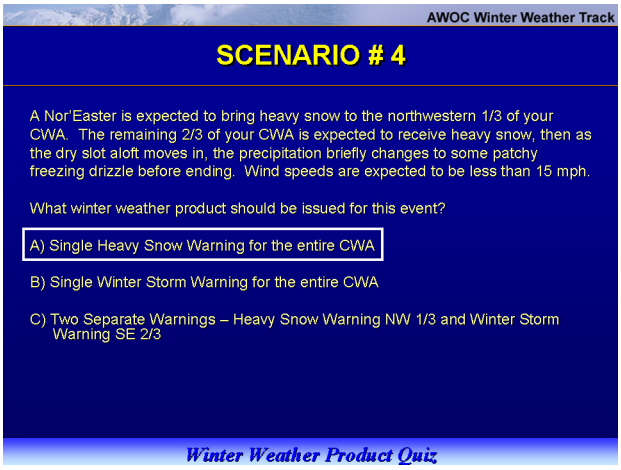
Student Notes:



40. SCENARIO # 4 (answer)

Instructor Notes: The answer is A, issue a single heavy snow warning for the entire CWA. The predominant precipitation is heavy snow.

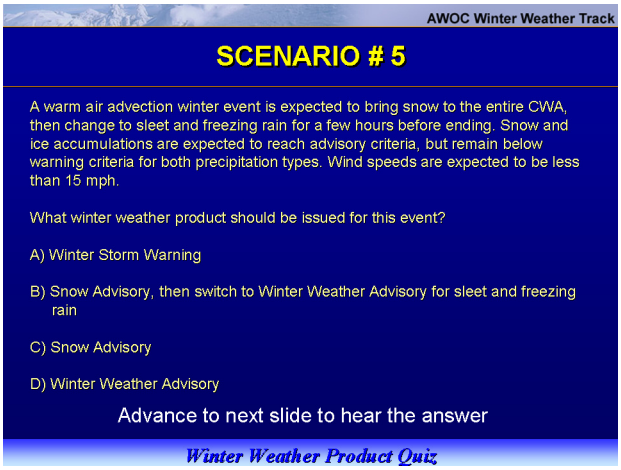
Student Notes:



41. SCENARIO # 5

Instructor Notes: Question 5 – A warm air advection winter event is expected to bring snow to the entire CWA, then change to sleet and freezing rain for a few hours before ending. Snow and ice accumulations are expected to reach advisory criteria, but remain below warning criteria for both precipitation types. Wind speeds are expected to be less than 15 m.p.h. What winter weather product should be issued for this event? A) Winter Storm Warning, B) Snow Advisory, then switch to Winter Weather Advisory for sleet and freezing rain, C) Snow Advisory, or D) Winter Weather Advisory.

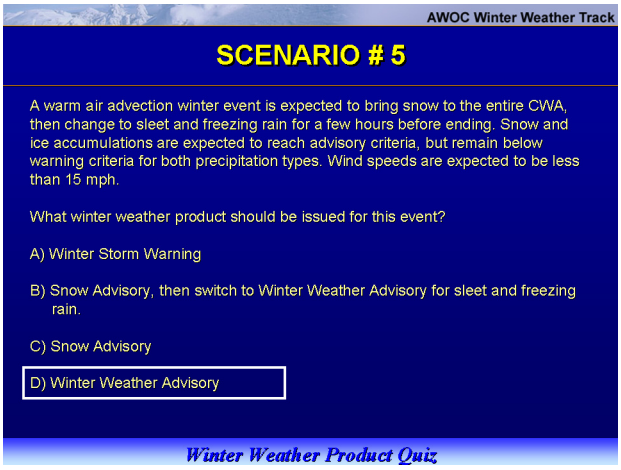
Student Notes:



42. SCENARIO # 5 (answer)

Instructor Notes: The correct answer is D, issue a winter weather advisory (WWA), since significant mixed precipitation events are expected to go with a generic WWA.

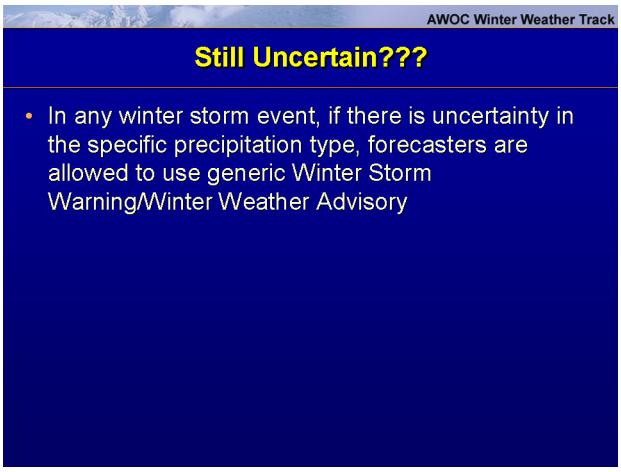
Student Notes:



43. Still Uncertain???

Instructor Notes: Although we as forecasters should try to provide the most accurate picture of what is to occur, there are situations that are rapidly changing, have tight gradients, or are just too close to call. If the forecaster feels there is too much uncertainty in the specific precipitation type, use the generic Winter Storm Warning or Winter Weather Advisory. In some parts of the country this will be the norm!

Student Notes:



44. Questions???

Instructor Notes: There are more scenarios on the LMS test. After going through this lesson if you have any questions, first ask your SOO (or your WCM about specific product formatting). Your SOO is your local facilitator and should be able to help answer many questions about AWOC. If you need additional info other than what your SOO provided, send an e-mail to the address on the slide. This address sends the message to all the instructors involved with this IC. Our answer will be CC'd to your SOO so that they can answer any similar questions that come up in the future. We may also consider the question and answer for our FAQ page. Thanks for your time and good luck on the exam!

Student Notes: